

**Abstract****Generation of variable differential group delay**

5 An apparatus for generating variable DGD is particularly  
for use in a PMD compensator. The apparatus has first,  
second and third birefringent elements arranged in order  
between the input and output of the compensator and  
having first, second and third differential group delays  
10 (DGDs) in the ratio 1:2:1. The orientation of the PSPs  
of the signal in each element relatively to the principal  
axes of the element is controlled, such that a change in  
orientation between the first and second elements is  
equal and opposite to a change in orientation between the  
15 second and third elements. This arrangement provides  
symmetrical relative rotations of the signal PSPs and  
principal axes about the central birefringent element.  
In combination with the 1:2:1 ratio, it can be shown that  
compensation of any first order PMD can be achieved  
20 without the compensator introducing additional second  
order PMD. The required level of first order PMD  
compensation is selected by controlling the amount of the  
orientation changes.